GSU Hodoscope
(with show and tell)

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ISU HCal Workfest

October 22, 2016

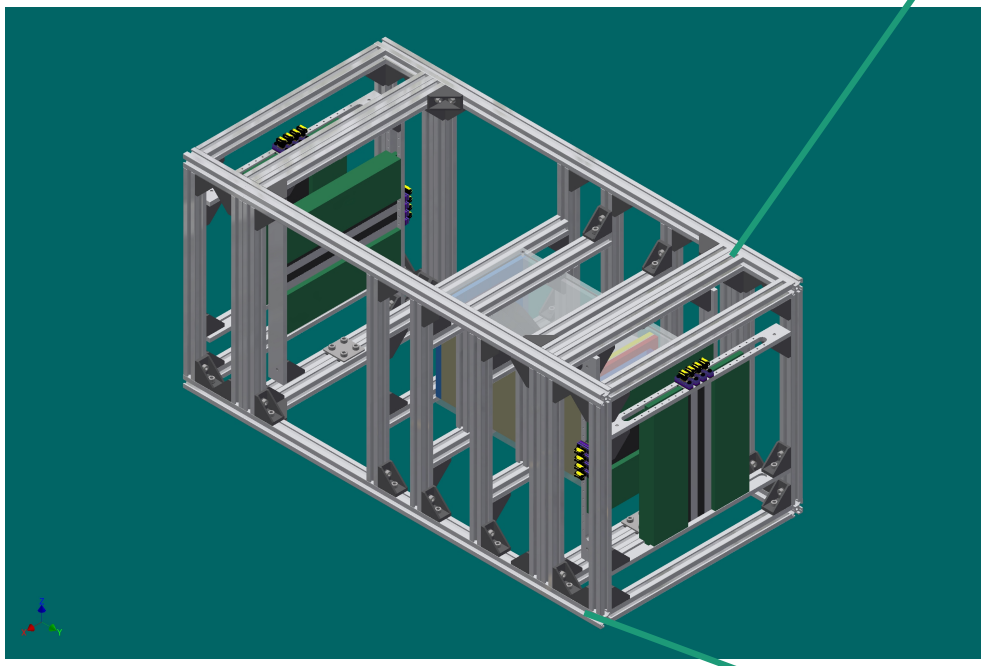
RIKEN BNL Research Center

About the Hodoscope

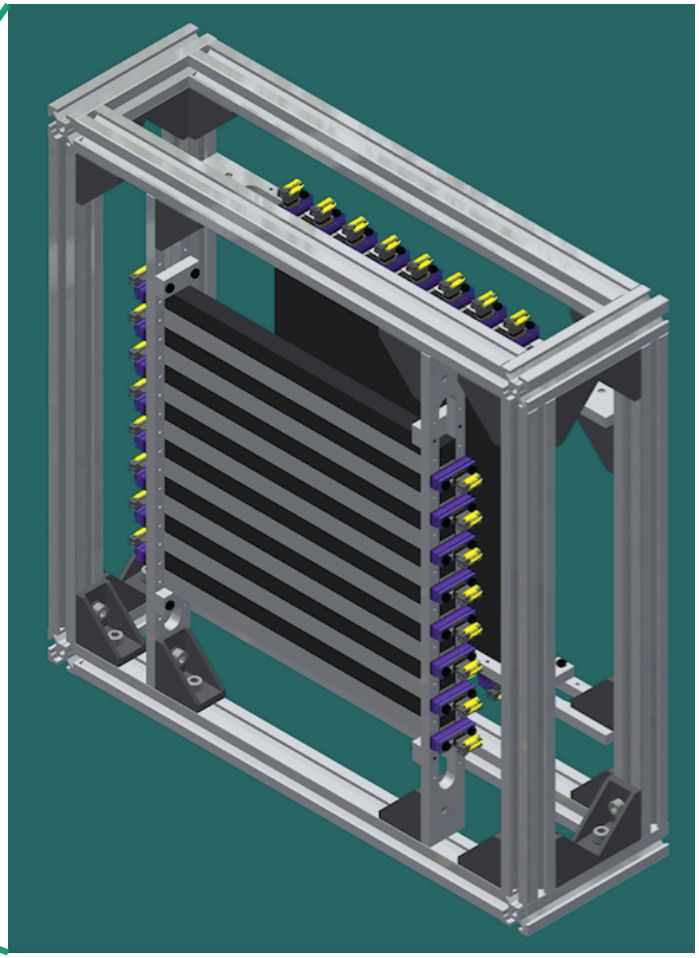
- This hodoscope was designed and built for testing a modular RICH prototype detector at Fermilab for the future EIC experiments for identifying charged hadron particles in the momentum range between 3 – 10 GeV/c.
- The hodoscope was built from scratch at GSU, which includes the following components:
  - Finger scintillators: 1cm x 1cm x 20cm
    - Cut from 1cm x 20cm x 20cm scintillator sheets from ELJEN at GSU physics shop
  - Wavelength shifting fibers were glued inside a groove
  - Readout PCB boards: include a spacer, preamp and service boards which were designed and built by GSU students.
  - MPPCs (i.e., SiPM) bias voltages were set with GSU built power supplies (one per channel) from a Raspberry PI.
  - The fingers are mounted inside an extruded aluminum frame

What does it look like?

How does it look like?

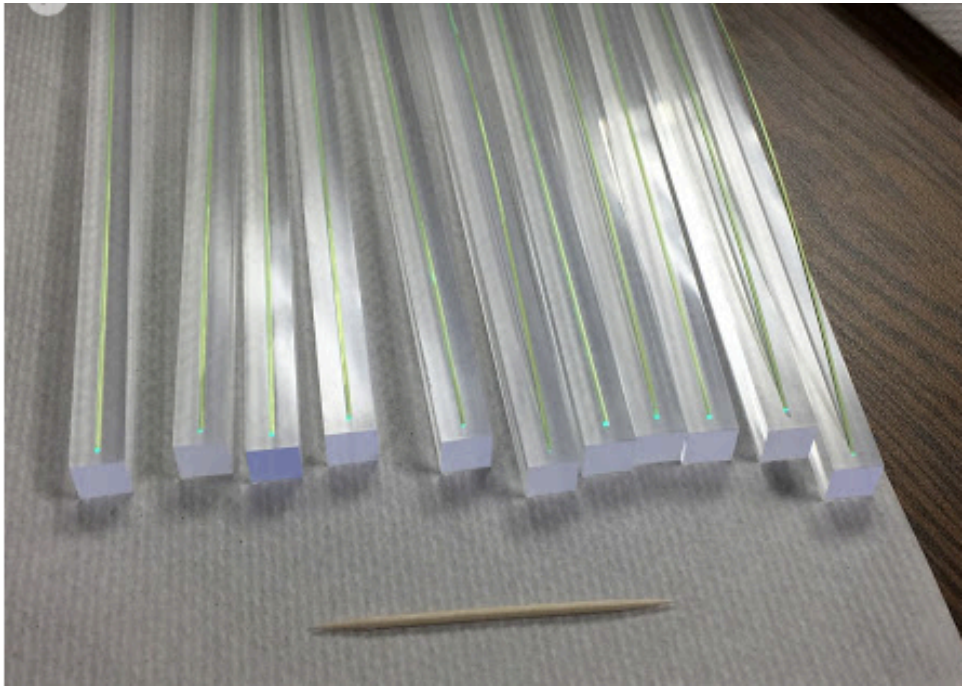


mRICH test setup



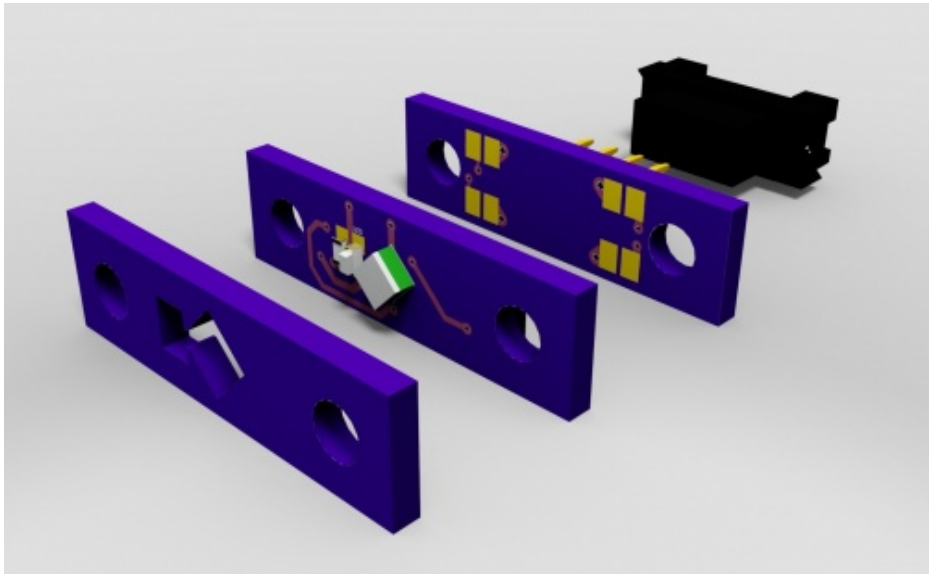
Scintillator

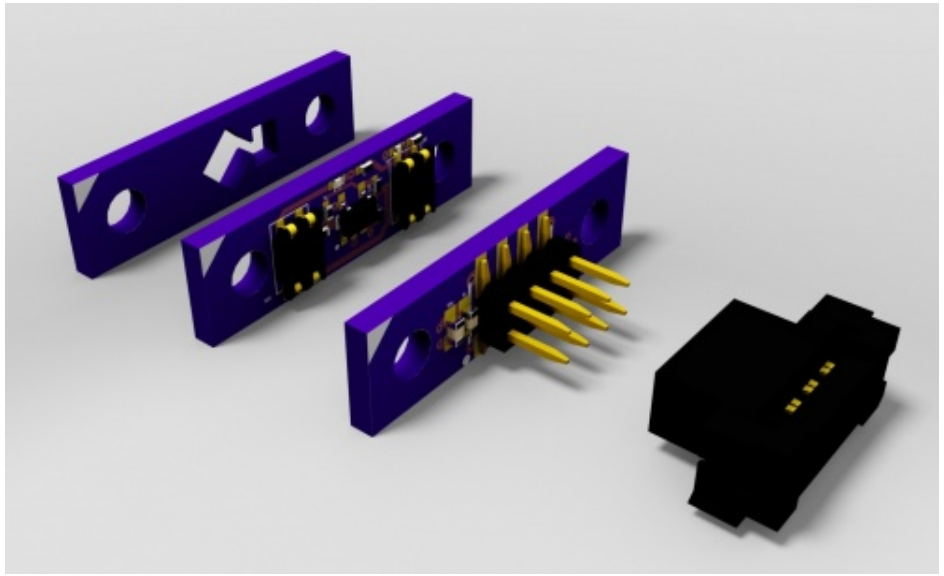
- Wavelength shifting fiber glued inside a



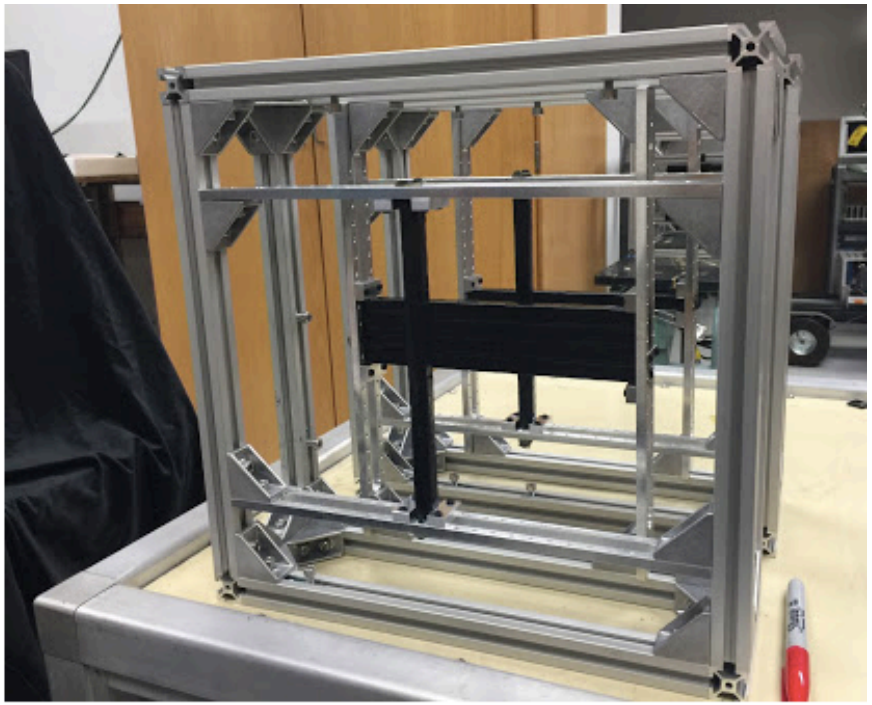
Readouts

Readout PCBs (3D renderings done by students)





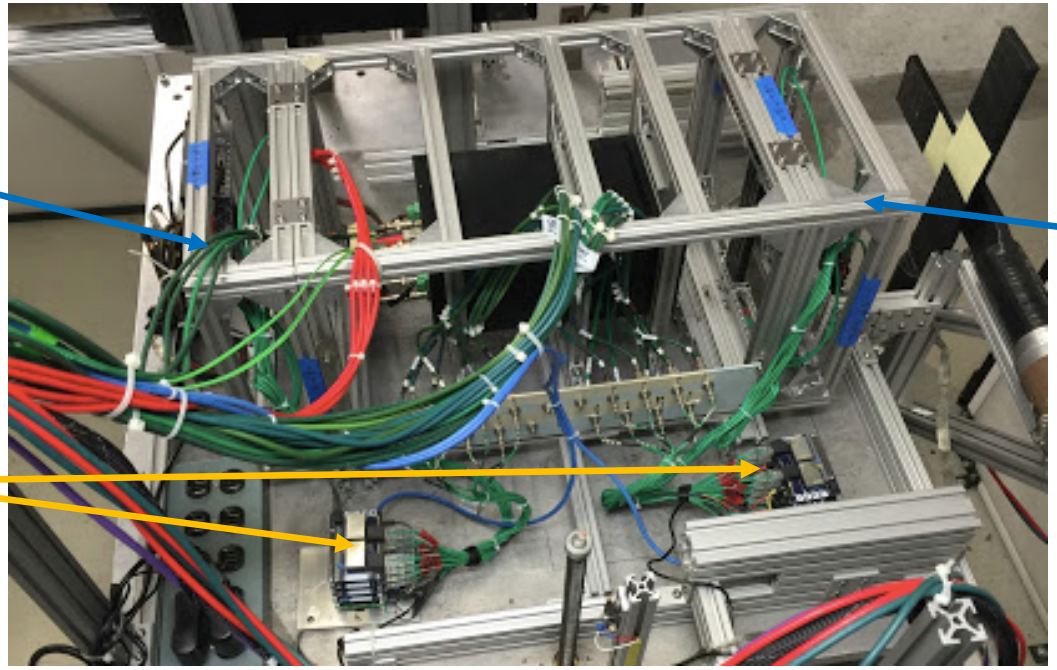
Assembly prior to Fermilab



- GSU students and Carola Butler assembling the hodoscope
- A partially assembled hodoscope

Hodoscope at Fermilab

mRICH setup at Fermilab



Assembly Continues

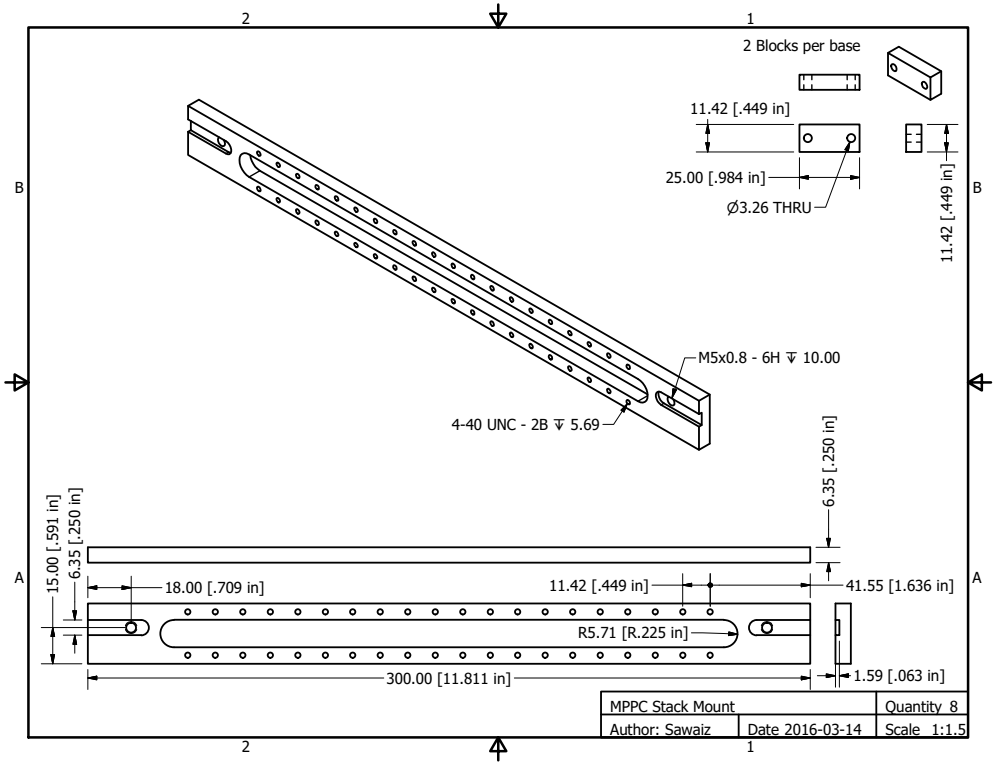
- New students also being trained

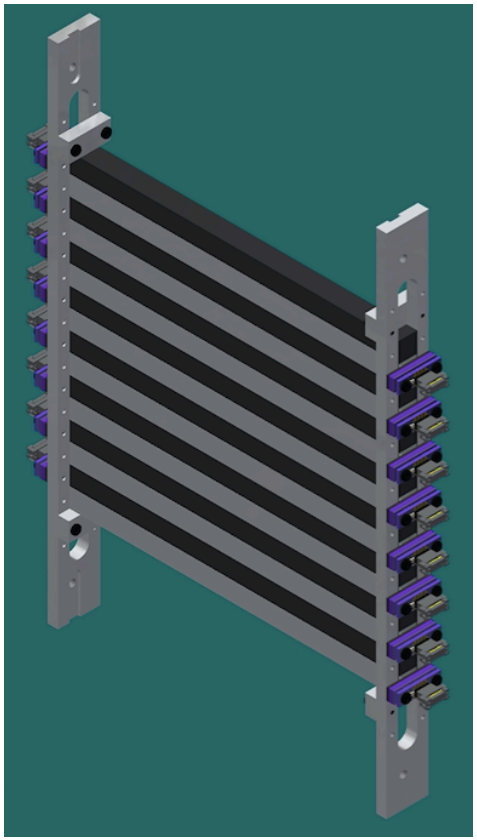
Next Calorimeter Beam Test

- Is this useful for tracking the beam for the sPHENIX HCal tests?
- In conjunction with the wire chamber?
- If so…
  - We can design a patch pnael to break out the amplified signals from each finger and feed them into the sPHENIX DAQ
  - 2 hodoscopes could be made available

More photos

Components


2 Blocks per base
11.42 [.449 in]
25.00 [.984 in]
Ø3.26 THRU
11.42 [.449 in]
M5x0.8 - 6H ↧ 10.00
4-40 UNC - 2B ↧ 5.69
6.35 [.250 in]
15.00 [.591 in]
6.35 [.250 in]
18.00 [.709 in]
11.42 [.449 in]
41.55 [1.636 in]
R5.71 [R.225 in]
300.00 [11.811 in]
1.59 [.063 in]
MPPC Stack Mount
Quantity 8
Author: Sawaiz
Date 2016-03-14
Scale 1:1.5



Assembling power supply